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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/554,359	10/25/2005	Seigo Muramatsu	Q91021	2995

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EXAMINER	
RALIS, STEPHEN J	

ART UNIT	PAPER NUMBER
3742	

DATE MAILED: 12/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/554,359	MURAMATSU ET AL.	
	Examiner	Art Unit	
	Stephen J. Ralis	3742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 October 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/25/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Applicant's claim for foreign priority benefit of Japanese Application No. 2003-122395, filed 25 April 2003, is acknowledged and granted.

Specification

2. The disclosure is objected to because of the following informalities:

Page 4, line10, "Using" should read –The use–;

Page 7, line 18, "(EGR)" should read –Exhaust Gas Recirculation (EGR) –

Appropriate correction is required.

Claim Objections

3. Claims 8, 10, 15 and 17 objected to because of the following informalities: all references of "overtemperature" should read –over-temperature–. Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1, 2, 4, 7 and 14 rejected under 35 U.S.C. 103(a) as being unpatentable over Beetz et al. (U.S. Publication No. 2002/0011484) in view of Hada et al. (U.S. Publication No. 2002/0179443).

Beetz et al. disclose an air heater system (1) comprising: an electrothermal heating element (PTC heating elements); a frame made out of metal (page 2, paragraph 23); and the control device being fixed within the box-shaped lateral frame bar (5; page 2, paragraph 31).

With respect to the limitation of a semiconductor switch connected to the electrothermal heating element in series for controlling energization to the electrothermal heating element, Beetz et al disclose control board (10) including control electronics (12) to determine the amount of current which is to be delivered by power electronics components (11) to respective heating elements (2). The printed circuit board (10) of Beetz et al. inherently has a semiconductor switching means within the control electronics (12) and power electronics components (11) or the printed circuit board would not be able to determine and control the amount of power delivered to the

device. Furthermore, Beetz et al. disclose connecting the PTC elements in series to the control device (page 2, paragraphs 31-33)

The claims differ from Beetz et al. in specifically calling for the semiconductor switch having a current detecting function provided with a terminal for current detection to detect a current which flows in the electrothermal heating element. However, a semiconductor switch having a current detecting function with a terminal to detect current flowing in the electrothermal heating element, as described by Hada et al., is known in the art. Hada et al. teach a heater control circuit (26) comprising a heater (39), a semiconductor switch (transistor 26a turns on/off based on microcomputer signal 20; page 85, paragraph 85; see Figures 3,4,6) having a current detecting function provided with a terminal (connection to microprocessor 20 to transistor 26a; see Figure 3) to detect current flowing in the electrothermal heating element (Ihe; page 5, paragraph 65; see Figure 3) to improve the controllability of a power supply to the heater and also minimize the error in determining the resistance of the heater (Abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Beetz et al. with the semiconductor switch and current detecting of Hada et al. to improve the controllability of a power supply to the heater and also minimize the error in determining the resistance of the heater.

With respect to the limitations of claims 2, Hada et al. further teach controlling a resistance value of the electrothermal heating element based on output corresponding to the current which flows in the electrothermal heating element detected through the

current detection terminal of the semiconductor switch (page 7, paragraph 98-99) to improve controllability and minimize error as noted above.

7. Claims 5, 6, 12, 13, 19 and 20 rejected under 35 U.S.C. 103(a) as being unpatentable over Beetz et al. (U.S. Publication No. 2002/0011484) in view of Hada et al. (U.S. Publication No. 2002/0179443) as applied to claims 1, 4, 7 and 14 above, and further in view of Hidetaka et al. (Japanese Publication No. JP 07078671 A) as evidenced by Bohlender et al. (U.S. Patent No. 5,057,672).

The Beetz-Hada air heater system combination discloses all of the limitations including a frame being made of plastic or metal, as described in claims 1, 4, 7 and 14 above, except for specifically calling for a part of the frame being resin. However, a part of a heater frame being resin, as described by Hidetaka et al., is known in the art. Hidetaka et al. teach a heat radiating part comprising of part of the frame-shaped case (3) made of a heat resistant resin being fixed in a frame shaped housing (4) made of metal to suppress conduction of the heat from the radiation part to the housing, thereby effectively heating the air through the heating element (English translation of Abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify frame of the Beetz-Hada air heater system combination with the part resin, part metal frame of Hidetaka et al. to suppress conduction of the heat from the radiation part to the housing, thereby effectively heating the air through the heating element.

With respect to the limitations of claims 5, 6,12, 13, 19 and 20 and the electrothermal heating element having such a temperature converging property that a temperature rises and then converges to a predetermined convergence temperature when the electrothermal heating element is continuously supplied with maximum allowable voltage, Beetz et al. explicitly disclose a PTC heating element being the electrothermal heating element. It is known in the art, as described by Bohlender et al. in column 2, lines 3-14, that PTC heating elements are characterized by low electric resistance in the cold state, this resistance increasing with rising temperature, so that the current flow through the PTC heating element is reduced as its temperature rises. It is also known that PTC heating elements have self regulating properties thereby preventing overheating of the PTC heating elements. Furthermore, the temperature capable of being attained by a PTC heating element can be determined by the selection of certain parameters during its manufacture. Therefore, the Beetz-Hada-Hidetaka air heater system combination inherently has a temperature converging property that a temperature rises and then converges to a predetermined convergence temperature when the electrothermal heating element is continuously supplied with maximum allowable voltage, due to the heating element being a PTC heater as evidenced by Bohlender et al.

In addition, with respect to the further limitations of claims 5, 12 and 19 and the resinous part being arranged in such a place that the resinous part has rigidity adequate for actual use even when the electrothermal heating element is at the convergence temperature, Beetz et al. explicitly disclose the frame of the heater being made of

plastic (page 2, paragraph 23). Furthermore, Hidetaka et al. explicitly teach the resinous material of the frame case (3) being heat resistant (English translation of Abstract). Therefore, if both Beetz et al. and Hidetaka et al. teach utilizing a resin material for the frame of a PTC element heater, the resinous part would inherently have a rigidity adequate for actual use even when the electrothermal heating element is at the convergence temperature inherent to a PTC heating element or the heaters would not function as intended.

Furthermore, with respect to the further limitations of claims 6, 13 and 20 and the frame including a resinous part made of resin having a predetermined deflection temperature under load, and the resinous part is arranged in such a place that the temperature of the resinous part remains below the deflection temperature under load even when the electrothermal heating element is at the convergence temperature, the Examiner respectfully reiterates that Beetz et al. explicitly disclose the frame of the heater being made of plastic (page 2, paragraph 23) and Hidetaka et al. explicitly teach the resinous material of the frame case (3) being heat resistant (English translation of Abstract). The Examiner, as well as Applicant within the specification, notes that any resinous part made of resin inherently has a predetermined deflection. Therefore, if both Beetz et al. and Hidetaka et al. teach utilizing a resin material for the frame of a PTC element heater, the resinous parts made of resin would inherently have a predetermined deflection temperature under load. Furthermore, the resinous parts of Beetz et al. (entire frame) and Hidetaka et al. (inner region adjacent PTC heater elements) would be inherently arranged such that the temperature of the resinous part

remains below the deflection temperature under load even when the electrothermal heating element is at the convergence temperature inherent to a PTC heating element or the heaters would not function as intended.

8. Claims 3, 8-11 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beetz et al. (U.S. Publication No. 2002/0011484) in view of Hada et al. (U.S. Publication No. 2002/0179443) as applied to claims 1, 4, 7 and 14 above, and further in view of Sommer et al. (U.S. Patent No. 2001/0021093) and Burner (U.S. Patent No. 5,823,155).

The Beetz-Hada air heater system combination discloses all of the limitations, as described in claims 1, 4, 7 and 14 above, except for the semiconductor switch having an over-temperature protecting function for interrupting current passing through the semiconductor switch when a temperature thereof becomes a shut-off temperature; and the semiconductor switch including an over-temperature signal output terminal which outputs an over-temperature warning signal when the temperature of the semiconductor switch becomes a warning temperature. However, temperature semiconductor circuit configurations having an over-temperature protecting function for interrupting current passing through the semiconductor switch when a temperature thereof becomes a shut-off temperature and further including an over-temperature signal output terminal which outputs an over-temperature warning signal when the temperature of the semiconductor switch becomes a warning temperature, as described by Sommer et al., is known in the art. Sommer et al. teach a semiconductor switch having an over-temperature protecting

function for interrupting current passing through the semiconductor switch when a temperature thereof becomes a shut-off temperature and (page 1, paragraph 8; page 2 paragraph 23 – page 3, paragraph 30; see Figures 1,2) and providing an output signal with respect to the over-temperature condition (ST1 and T2) to provide the ability to distinguish between an overload/short circuit and an over-temperature case, providing more information to outside of the switch, thereby increasing the operational efficiency of the semiconductor switch.

Furthermore, such a semiconductor switch controlling an auxiliary heating apparatus in vehicles, as described by Burner, is known in the art. Burner teaches a control circuit for an auxiliary heater comprising a semiconductor switch (power switching transistor PROFET P; page 5, lines 29-64) to provide an error diagnosis and self-protecting deactivation of the auxiliary heater (column 3, lines 34-37), thereby increasing the operational lifetime of the heater.

With respect to the limitations of claim 3 and detecting a failure of the electrothermal heating element by detecting a resistance value of the electrothermal heating element based on output corresponding to the current which flows in the electrothermal heating element detected through the current detection terminal of the semiconductor switch, Sommer et al. further teach a signal related to the voltage signal (AS; see Figure 2) relative to load of the device to which the semiconductor switch is connected to provide the ability to determine a overload/short circuit providing more information to outside of the switch, thereby increasing the operational efficiency of the semiconductor switch.

With respect to the limitation of claim 10 and including an over-temperature protecting means for interrupting the current passing through the semiconductor switch in response to the over-temperature warning signal from the over-temperature signal outputting terminal of the semiconductor switch, Sommer et al. teach that the over-temperature signal can be detected from the outside (page 1, paragraph 8; page 3, paragraph 30) to provide more information to outside of the switch, thereby increasing the operational efficiency of the semiconductor switch.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the Beetz-Hada air heater system combination with the overload and over-temperature distinction and protection of Sommer et al. and teaching of the use of such a semiconductor switch in auxiliary heating components of a vehicle of Burner, to provide the ability to distinguish between an overload/short circuit and an over-temperature case, providing more information to outside of the switch, thereby increasing the operational efficiency of the semiconductor switch..

With respect to the limitation of claims 8 and 15 and the semiconductor switch being fixed to the frame in such a place that the temperature of the semiconductor switch becomes the shut-off temperature when the temperature of the electrothermal heating element reaches an excessive temperature, Beetz et al. explicitly disclose the control device of the heater fixed within the frame (prior art; page 1, paragraph 4; invention; page 2, paragraph 25; see Figures 3,4). Therefore, the Beetz-Hada air heater system combination in view of Sommer et al. and Burner would inherently have the

semiconductor switch attached to the frame and further inherently shut-off when the temperature of the electrothermal heating element reaches an excessive temperature.

Prior Art

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Japanese Publication No. JP 01151190 A to Nakagawa et al. is a teaching of heating unit frame may be made of resin or the like to be light weight and low costing to manufacture.

Patent No. JP 9-245939 A; JP 11-202680 A; JP 10-309935 A; JP 7-217508 A; JP 2000-257518 A and JP 9-296758 A are cumulative to or less pertinent than the references relied upon above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Ralis whose telephone number is 571-272-6227. The examiner can normally be reached on Monday - Friday, 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans can be reached on 571-272-4777. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Stephen J Ralis
Examiner
Art Unit 3742

SJR
November 29, 2006

Robin D. Evans

ROBIN EVANS
SUPERVISORY PATENT EXAMINER
12/10/06